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ABSTRACT

This qualitative study explores philosophies, life experiences, educational preparation, classroom techniques, and perceived limitations that enhance or prevent a feeling of successful teaching practice for six middle school science teachers who have at least one but no more than four years of science teaching experience. The study was conducted in two middle schools in a large school district in South Central Texas. Data were collected using a variety of sources including participant opinion documents, formal and informal interviews and observations, team and science department meetings, field notes, and photographs. Analyses of data resulted in information about personal characteristics and experiences that typify an effective novice science teacher, barriers that discourage teachers from remaining in the teaching profession, classroom techniques that appear to contribute to a successful learning environment, and suggestions to assist the new teacher in coping with the stresses associated with the induction years. (Contains 15 references). (Author)

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THE INDUCTION YEARS: PATHWAYS AND BARRIERS TO EFFECTIVE PRACTICE FOR THE MIDDLE SCHOOL SCIENCE TEACHER

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Abstract: This qualitative study explores philosophies, life experiences, educational preparation, classroom techniques, and perceived limitations that enhance or prevent a feeling of successful teaching practice for six middle school science teachers, who have at least one but no more than four years of science teaching experience. The study was conducted in two middle schools (grades 6, 7, and 8) in a large school district in South Central Texas. Data were collected using a variety of sources, including participant opinion documents, formal and informal interviews and observations, team and science department meetings, field notes, and photographs. Analyses of data resulted in information about personal characteristics and experiences that typify an effective novice science teacher, barriers that discourage teachers from remaining in the teaching profession, classroom techniques that appear to contribute to a successful learning environment, and suggestions to assist the new teacher in coping with the stresses associated with the induction years.

Teaching occurs within a very complex environment and requires creativity, knowledge, skills, patience, time management, a feel for what is happening intellectually in the classroom, an ample supply of energy, and a sense of humor. R. A. Duschl (1990) commented that it takes a skilled teacher to establish an effective learning environment, especially with the diversity of students and the number of tasks outside the classroom that teachers must face in today's schools.

What are the professional requirements for an effective science teacher? Certainly teachers should have adequate content knowledge, a repertoire of pedagogical skills, and a general understanding of the psychological aspects of the learners. Yager, Hidayat, and Penick (1988) found that effective teachers analyze tasks in detail and predict what will confuse or distract students, present rules, procedures, expectations and assignments to students in a clear, detailed manner, establish classroom routines, establish a system of student accountability for behavior and academic work, and consistently monitor behavior and work and provide feedback on its appropriateness.

A multitude of influences are responsible for molding teaching practice, including philosophies and beliefs that have been imprinted during the life of an individual. Goodson (1992) stated that life experiences are the key ingredients to who we are; therefore, these experiences shape our practice. And Clark (1992) commented that one's beliefs and personal theories set boundaries or frames around

what is seen and how experience is interpreted.

Educational preparation and training are factors that influence the new teacher, and whether these factors are considered good or bad, learning will be acquired from some of these experiences and transferred to the classroom. Yeany (1991) stressed the need for a strong academic background for successful planning, teaching, and development of student potential. Stepans, McClurg, and Beiswenger (1995), in a study of teacher education programs, commented that science content courses at the university level usually consist of three hours of large group lecture accompanied once a week by a lab activity, none of which provide an appropriate teaching model for prospective teachers.

The first years of teaching are periods of constant evaluation, compromise, and adjustment. This initial time also influences and helps to establish behaviors and beliefs about practice. Unfortunately, it is also a time when attrition rates are high. In a study of the staying power of new teachers, the Texas Education Agency (1996) reported that almost 30% of new teachers leave the system at least once during the first five years of practice. Wise (1990) noted that some districts lose 40% of beginning teachers within the first two years.

But many novice teachers choose to remain in their profession and contribute considerable time, effort, and expertise to making school a worthwhile place for students. What personal traits and skills do these individuals possess that allow successful assimilation into the educational environment? Do their unique life experiences and training enable them to cope and adapt more easily than others? What part of their preservice education do they value? Are they more open to change and new ideas? How do they view their own practice? Do they find pathways through the maze of teaching barriers that must be confronted every day?

There is a need to use teachers as resources and partners in educational research. They are the ones who experience the demands, both mental and physical, of the classroom on a daily basis. They are the thinkers, managers, entertainers, guides, and resources for the multitudes of students who enter their classrooms each year. Therefore, research in education needs to explore how teachers interpret, give

meaning to, and make decisions about their experiences in the classroom.

Purpose

The purpose of this study is to explore philosophies, life experiences, educational preparation, classroom techniques, and perceived limitations that may enhance or prevent a feeling of successful teaching practice for six middle school science teachers who are considered novices (each has at least one year and no more than four years of science teaching experience). These findings may be utilized by the education community with the hope that they can provide suggestions and coping mechanisms that will encourage the new, as well as the experienced teacher, to remain in the classroom.

Research Design and Methods

The naturalistic paradigm was selected for this study because the purpose was to represent, as accurately as possible, the philosophies, feelings, and views of the participants involved. Six teachers from two middle schools in a large school district in South Central Texas volunteered to be a part of the research. The teachers and the schools were given pseudonyms in order to protect the privacy of each. The enrollment at each school was approximately 1200 students.

Two teachers, Greg and Susie, represented School A. Greg taught seventh grade life science in addition to coaching competitive sports, and Susie taught eighth grade earth science. Both teachers had completed their first year of science teaching. Elizabeth, Sally, Marie, and Ann taught at School B, where Elizabeth and Marie taught seventh grade life science, Ann eighth grade earth science, and Sally sixth grade science. The number of years of teaching experience for each were: Elizabeth, four; Sally and Marie, three each; and Ann, two.

Data Collection

Data collection included a variety of sources. A one-page document to promote reflection about teaching philosophies and expectations was completed by each participant prior to the first formal interview. This document served as a springboard for the study. A second document was completed after the first interview. It requested a single statement about the teacher's concerns when

teaching science and asked the participant to draw or illustrate in some way a graphic representation of science teaching. Two formal interviews, 45 - 60 minutes in length, were audiotaped, transcribed, and member checked for accuracy by each participant. Two observations of a one-period class per teacher were completed during the semester. In addition, numerous informal visits and observations, team meetings, science department meetings, meetings with principals, field notes, and photographs were included. I kept a reflexive journal to record thoughts, schedules, planning, and comments.

Data Analyses

Data were analyzed by chunking, which is a method of examining and coding by topic all transcribed interviews, written reports of observations, field notes, and documents, in order to discover common themes relating to teaching practice. When this process was completed, data were triangulated to discover if similar themes emerged from different data sources, providing credibility for the data.

Emergent Themes

In order to provide insight into personalities and techniques of induction years teachers, I focused on six themes that emerged from the study. Viability of these themes was determined by member checking with participants as data were collected and by discussions and review with peer debriefers. The themes are: Personal and Philosophical Characteristics of the Participants, Teacher Preparation and Life Experiences, Philosophies of Science Teaching, Successful Techniques for Learning, Barriers to Effective Classroom Practice, and Pathways to Success.

Personal and Philosophical Characteristics of the Participants

What personal and philosophical characteristics typify the novice middle school science teacher? Two prerequisites for successful teaching that emerged in the study were a caring attitude and a desire to play a role in the development of children. In a review of the National Commission on Teaching and America's Future, Darling-Hammond (1996) included a need for caring teachers in her recommendations. Greg commented that an individual must "really want to help kids. That is the most important thing in teaching." On one of the documents,

Elizabeth wrote that her basic love for kids provided the foundation for her desire to be a teacher.

A third characteristic is a willingness to understand students and to view life from their perspective. Sally remarked, "You have to get on their level. They have to understand what you are trying to do and why you are doing it." And a teacher must enjoy interaction with students. Elizabeth feels that students are a source of energy for her, that they "pump me up!"

All participants like the idea that teaching is never dull; it is constantly changing. Sally said she loves the change each day brings. "The years fly by. You're constantly in motion." Other characteristics evident in the data include friendliness, having an abundant amount of energy, and being considerate, creative, self-sufficient, cooperative, and persistent. Wilson (1993) affirmed these attributes by stating that successful teacher leaders work hard, are creative because of their power to motivate students, and are gregarious and energetic.

Preparation/Life Experiences

What constitutes adequate preparation for teachers in preservice education? When the six participants in this study were asked to discuss what they valued most in preservice education, five of them said their student teaching experience was the most helpful. Because she was placed in an elementary classroom instead of middle school, Sally stated that her student teaching experience was not helpful, except for time management, for teaching middle school students. Methods courses that provide opportunities for writing objectives and lesson plans and mini-teaching experiences are valuable, according to the participants, as are observations of other teachers in the classroom. Sally and Greg believe science content courses are very important, also.

Ball and Goodson (1985) stated that teachers' previous careers and life experiences shape their view of teaching and the way they set about the task of classroom practice. Susie, Elizabeth, and Ann said that they frequently baby-sat when they were teens, and that they grew up in an environment where there were siblings or cousins with whom to interact. Greg, Elizabeth, and Ann have parents or

other relatives who are teachers or are associated in some capacity with education. Janie and Greg worked with youth groups outside of the school setting prior to teaching, and for Janie and Sally, teaching is a second career. Both feel their previous work experience is beneficial in adjusting to the classroom and dealing with students and parents. All participants report supportive family groups that encourage education, achievement, and success. And the results of a participant survey indicate that all feel they are adequately prepared in the science field, since each has completed at least 30 hours of content course work, most of which is in life science.

Philosophies of Science Teaching

A characteristic within this theme is the desire to be a teacher. Sally remarked that "you have to want to be a teacher. You just have to have that deep down want to!" Ann expressed a desire to share knowledge, and she feels the best way to do that is to be a teacher. Susie realized the importance and need for good teachers when she had children of her own.

A love and appreciation for science is another characteristic that is evident in the study. Susie, Marie, and Sally expressed a genuine love for science, and Ann remarked that "science has given the world so much, but most people do not give it the consideration it deserves."

That science should be fun and that it should be related to students' lives are other characteristics that are evident. Greg remarked several times during interviews and observations that students can enjoy science, that it is interactive, and it is easy to keep students interested. On one of her documents Elizabeth wrote, "I want the kids to enjoy the lesson. Of course, I'm concerned if they're learning the content, but I figure if they are having fun, the learning will come naturally." Susie uses clips from popular movies to enhance learning about space, and she observed that students would pay more attention if well-known actors became a part of a science lesson. Greg often holds classes outside, where students play games and complete labs that are directly related to the school and student environments. Ambach (1996) stated that teachers should make learning experiences meaningful

for students.

A final characteristic is the need to modify lessons in order to meet the learning levels of all students. Marie commented that she believes every student can learn, and the key to this is to use the correct tools. Sally commented, "I think one reason I am successful is because I really vary my teaching styles."

Successful Techniques for Learning

All six participants indicated that they consider themselves successful and effective teachers. Shapiro (1995), in a report about teacher indicators for success, listed five requirements for accomplished teaching. These included teachers who are committed to students and their learning, teachers who know the subjects they teach and know how to teach those subjects to students, teachers who are responsible for managing and monitoring student learning, teachers who reflect about their practice and learn from experience, and teachers who are members of learning communities. Table 1 lists the techniques observed during the study that appear to contribute to a feeling of success.

Barriers to Effective Practice

A report on the status of educators in the *Kappan* (Huelskamp, 1993) stated that teachers have low self-esteem due to misinterpretations of data such as average SAT scores and international comparisons. This unfortunate cycle of low self esteem, followed by unfounded public criticism, confronts teachers daily in journal and newspaper articles and on public television. Susie remarked that she was respected when she worked as a chemist for an oil company, but she is not respected as a teacher. "We have disrespectful students," Marie remarked.

Elizabeth said that parents condone the bad behavior of students and blame teachers for their failure. Lack of discipline on the part of students is a common barrier mentioned by participants in the study. Greg thought that dealing with uncooperative, unrealistic, and apathetic parents might be a "quicker turn-off to teaching than any other factor."

Student lack of effort and readiness to learn are factors that all teachers consider barriers to remaining in the teaching profession. Marie painted a dismal

Table 1. Successful Techniques for Learning.

The teacher:

*displays a weekly agenda in the classroom; uses this as a quick, visual reference to reinforce daily/weekly objectives;
*uses a lesson-related warm-up activity on the overhead projector to engage students immediately when class begins;
*follows through after the warm-up, using it as an introduction to the lesson;
*uses clear, attractive overhead transparency of objectives to focus the lesson;
*physically demonstrates the procedures for all activities;
*constantly checks for understanding by asking students specific questions related to class activities;
*ensures that all students are included in a group and that all are working on the lesson;
*uses short quizzes after lab activities/lessons prior to major exams to provide feedback regarding student understanding;
*frequently uses more than one method of evaluation other than tests (projects, group work, reports, displays, posters);
*varies teaching techniques frequently;
*connects new information to previous learning;
*plans lessons that have practical application and meaning to students' lives;
*allows no down time; activities are hands-on, requiring students to manipulate equipment, gather and record data, discuss results in groups;
*presents notes as active discussions, with students filling in spaces on an outline provided by the teacher;
*brings the lesson to a close by summarizing class activities, stating when assignments are due, and giving the objectives for the following day;
*dismisses students when they are ready (quiet, lab materials put away, desks clean);
*kind but firm, consistent, gives specific, clear instructions, states expectations;
*is in charge at all times.

picture of students. "Most show a consistent lack of effort....They really don't care," she wrote on one of her documents.

Paper work, especially with regard to the self-evaluation process required by the school district, is a troublesome determent for most of the participants. This was obvious during a science department meeting at School A, where "The Paper

Chase" was the major and most controversial topic. Examples of materials teachers are required to submit to the administration for their personal evaluation folders include test samples, writing samples, lesson plans, modifications for various learning levels (honors, regular, special education), and explanations and examples of how the Texas Assessment of Academic Skills (TAAS) is included in the teaching process. When asked what she considered barriers to being a teacher, Elizabeth listed inclusion, short class periods, excess emphasis on TAAS, and documentation of *everything*.

That teachers receive very little in return for the amount of effort expended was mentioned by Elizabeth and Marie, and both participants include this as a factor that could eventually affect their decision to continue teaching. And several times during the study the status of science education in Texas public schools was mentioned. Ann wrote, "...I don't think students take the subject matter (science) seriously, because they have come to understand that science is not really counted (since it was not a part of TAAS)."

Pathways to Success

One of the purposes of this study is to learn about coping strategies that participants use to survive the induction years in the classroom, with the hope that these insights can be useful to other new or prospective teachers. As the data was reviewed and categorized into themes, a list of coping techniques was compiled. This list was reviewed and discussed by all participants at a final group meeting at the conclusion of the study. The suggestions are found in Table 2.

Concluding Remarks

The purpose of this study is to provide insights into the thoughts, habits, and teaching styles of six middle school science teachers who have at least one but no more than four years of science teaching experience. Several questions were asked at the beginning of the study, including what do novice teachers value in preservice training, what does the novice bring from life experiences and philosophies that are incorporated into practice, how do new teachers view their own practice, what science content is sufficient to provide a knowledge base from which to teach, and

Table 2. Pathways to Successful Practice.

*Watch other teachers; ask to observe their classrooms.
*Find a mentor/mentors; seek advice from them or other teachers.
*Learn by trial and error which people (teachers, administrators, counselors, librarians, secretaries) are most receptive when advice or assistance is needed.
*Keep lesson plans from one year to the next to provide a basic guide and time line for teaching; write notes about what works, what doesn't; modify when necessary.
*Constantly adjust lessons to fit the needs of students; it is acceptable to change plans in the middle of a unit or lesson if things are not working.
*Plan lessons carefully; use an outline that includes weekly, semester, and yearly topics and activities; coordinate these realistically with the school calendar.
*Manage time efficiently (take a time management course or workshop, talk to other teachers who appear to be efficient, visit the library for suggestions on how to manage time).
*Do not take unpleasant classroom incidences personally.
*Take as little home as possible; learn to use time before and after school and during conference period to do some grading; be selective with what is graded (for example, select three of the most difficult questions to check instead of grading all, allow students to grade some in class, don't grade everything - give work credit instead).
*Slow down if the pace becomes too hectic; if the teacher is overworked, so are the students.
*Pick and choose from the district curriculum guide; it is impossible to cover it all.
*Dare to be different with techniques and style and new ideas.
*Attend science workshops, conventions, and meetings when possible.
*Volunteer to help write curriculum at the campus, district, and state levels; many ideas are exchanged with other teachers during these sessions.
*While taking preservice education courses, begin to stockpile as much information about teaching as possible (lessons, hand-outs, journal articles, examples of labs); set up a file prior to the first teaching job. This should be a continuing activity throughout the teaching career.
*Subscribe to *Science Scope*. Keep all copies on file.
*Take time for yourself.

why do some teachers stay and others leave during the induction years? The resulting themes and their characteristics provide some enlightenment for educators regarding these questions, at least in this setting at this particular time in the lives

of the six teachers who agreed to participate.

It is my intent and hope that outcomes from this study will serve as a source of information and insight into classroom practice for prospective and induction year teachers, providing models, personality portraits, techniques, and coping skills for surviving the first five years in the classroom. Preservice educators may also find the study useful, since views, comments, and suggestions were expressed by those individuals who are most dependent upon preservice training and the student teaching experience.

Sparks-Langer and Colton (1991) commented that teachers need opportunities to construct their own narratives and meanings from information provided by research, theoretical frameworks, or outside sources. "Future research needs to explore how teachers interpret, give meaning to, and make decisions about their experiences in school. Teachers themselves will need to be included as co-investigators in such research." This study allowed teachers to become involved as co-investigators and provided opportunities for them to reflect upon their own experiences as educators. It also provided working hypotheses, in the form of emergent themes, for further investigation of teacher philosophies, beliefs, and practices.

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